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# Host-Guest complexes of drugs emodin, piroxicam and indomethacin with cucurbiturils: UV-visible, fluorescence, $^1$H NMR and Raman spectroscopic study.

Paz Sevilla[1,2]*, Elisa Corda[2], Margarita Hernández[2], José V. Garcia-Ramos[2], Concepción Domingo[2]

[1]*Departamento de Química Física II, Facultad de Farmacia, Universidad Complutense de Madrid, 28040 Madrid, Spain.*
[1]*Instituto de Estructura de la Materia, CSIC, Serrano 121, 28006 Madrid, Spain.*
**paz@ucm.es*

Bioavailability of drugs is directly related with their solubility and therapeutic effects, and with a specific form of the possible ones that coexist in equilibrium in the body. Effort is actually devoted to design and develop new drug delivery systems to optimize the medicinal effectiveness of prescribed medicines. Cucurbiturils have revealed, together with cyclodextrins, as suitable host molecules to include drugs as guest thus improving bioavailability and avoiding possible secondary effects.

In this work we have studied complexes formed by emodin (EM), piroxicam (PX) and indomethacin (IM) with cucurbit[6]uril, cucurbit[7]uril and cucurbit[8]uril using different spectroscopic techniques: UV-visible, $^1$H-NMR, fluorescence and Raman, and several pH's conditions have been chosen. EM is an anti-tumoral drug poorly soluble at acidic pH´s, PX and IM are non-steroidal anti-inflamatory drugs insoluble in water solvent. We have also studied the formation of the complexes adsorbed on silver nanoparticles (AgNPs) surfaces, and SERS (Surface Enhanced Raman Scattering) experiments have been analysed in order to characterize the interactions between the complexes and the metal surface.

EM PX IM

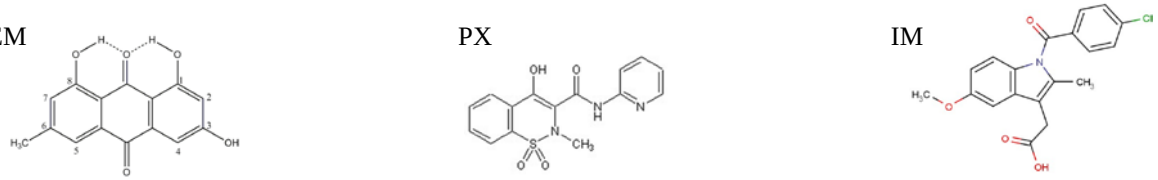

***Figure 1.0****: Molecular structures of Emodin (EM), Piroxicam (PX) and Indomethacin (IM)*

Our study shows that EM forms complexes at acidic pH=2 with both cucurbit[7]uril (1:1) and cucurbit[8]uril (1:1) and no complexes are found neither with cucurbit[6]uril nor basic pH's. In the case of PX complexes are formed with cucurbit[8]uril (1:1)and IM complexes have only been detected at pH=6 and with cucurbit[6]uril (1:1) and cucurbit[8]uril (1:2).

Results presented here constitute an important contribution to future applications of the host-guest complexes studied and could be used in bio-nanotechonology and nanomedicine.

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